AMENDMENTS TO THE SPECIFICATION

Please amend the paragraph on page 2, line 13 as follows:

~~Disclosure~~ Summary of the Invention

Please amend the paragraph on page 2, line 21 to page 3, line 11 as follows:

To attain the above-described object, firstly, the present invention provides a method for ultra-fast conversion of time signal into two-dimensional space ~~signal~~ signal, wherein a signal light pulse and a reference ultra-short light pulse having an appropriate width in space are introduced into a nonlinear crystal through a dispersion device and ~~an~~ a one-dimensional Fourier transformation optical ~~system, a~~ system. A second-harmonic which is generated by satisfying phase matching condition in the nonlinear crystal in subjected to time-to-space conversion through an inverse one-dimensional Fourier transformation optical system so as to be converted into ~~an~~ a one-dimensional space distribution, the time-to-space converted one-dimensional space distribution is subjected to filtering with a time-frequency filter provided on a filter plane of ~~an~~ a one-dimensional space frequency filtering optical system, and a time-frequency expanded two-dimensional light distribution representing a relation between time and frequency of the signal pulse light is regarded as a two dimensional space signal.

Please amend the paragraph on page 3, line 12 to page 4, line 16 as follows:

Secondly, the present invention provides a method for ultra-fast conversion of time signal into two-dimensional space ~~signal wherein~~ signal, wherein a signal light pulse and a reference ultra-short light pulse having an appropriate width in space are introduced into a dispersion device at angles symmetric with respect to the optical ~~axis, light~~ axis. Light waves from the

signal light pulse and the reference ultra-short light pulse which are a dispersed due to a time difference generated by a difference of incident positions on the dispersion device are passed through ~~an~~ a one-dimensional Fourier transformation optical system so as to be converted into one-dimensional frequency light distributions having different incident angles depending on the incident positions on the dispersion ~~device, the~~ device. The one-dimensional frequency light distributions is introduced into a nonlinear optical crystal, a second-harmonic which is generated by satisfying phase matching condition determined depending on an angle formed by the incident one-dimensional frequency light distributions is subjected to time-to-space conversion through an inverse one-dimensional Fourier transformation optical system so as to be converted to an one-dimensional space distribution, the time-to-space converted one-dimensional space distribution is converted into ~~an~~ a one-dimensional space frequency distribution by ~~an~~ a one-dimensional Fourier transformation optical system, and the one-dimensional space frequency distribution is subjected to filtering by a time-space ~~filter, light~~ filter. The light wave thus obtained is subjected to time-frequency expansion through an inverse one-dimensional Fourier transform optical system so as to obtain an intensity distribution of a two-dimensional light distribution, and the time-frequency expanded two-dimensional light distribution representing a relation between time and frequency of the signal pulse light is regarded as a two dimensional space signal.

Please amend the paragraph on page 4, line 17 to page 5, line 27 as follows:

Thirdly, the present invention provides the above-described methods for ultra-fast conversion of time signal into two-dimensional space ~~signal wherein~~ signal, wherein space

frequency filtering is employed as the time-frequency filter, and fourthly, the present invention provides either of the above-described methods for ultra-fast conversion of time signal into two-dimensional space ~~signal wherein~~ signal, wherein the time-frequency filter has a different transmissivity distribution and a vertical cut out position of a space frequency component of a light wave outputted from the one-dimensional Fourier Transform light system is arbitrarily selected.

Please amend the paragraph on page 6, line 4 to page 7, line 7 as follows:

Fig. 1 shows an example of the structure of the time-to-two-dimensional space signal conversion optical system for performing the method of ultra-fast conversion from time signal to two-dimensional space signal according to the present invention. This time-to-two-dimensional space signal conversion optical system 1 is capable of converting a signal light pulse being a time signal, which is ultra-short pulse laser light in this example, into a two-dimensional space signal corresponding to time and frequency by using a dispersion device such as a diffraction ~~grating, an~~ grating, a one-dimensional Fourier transformation lens, ~~an~~ a one-dimensional inverse-Fourier transformation lens, a nonlinear crystal for generation of a second-harmonic, ~~an~~ a one-dimensional space frequency filtering system, and time-frequency filter. That is, as shown in PLO1, signal lights (3) and (4) are introduced into a diffraction grating (2), which is a dispersion device, at angles symmetric with respect to the optical axis, and thereby light waves are deflected in a direction based on the diffraction formula. Because each of the signal light and the reference light has a certain width in its incident beam, a time difference occurs depending on their incident positions onto the diffraction grating. Then, the light waves are subjected to Fourier transform

with respect to horizontal components by ~~an~~ a one-dimensional Fourier transform optical system composed of a cylindrical lens (5), and thereby spectrum distributions of the signal light and the reference light are obtained on a nonlinear crystal plane (101) as space distributions. Because the propagation direction (wave vector) of the lightwave differs depending on a difference of the incident position onto the diffraction grating, the wavefront of the light wave rotates with time in the nonlinear crystal plane 101.

Please amend the paragraph on page 8, lines 5 to 18 as follows:

The second-harmonic filtered by the time-frequency filter has a wave vector corresponding to time in a horizontal direction and a distribution corresponding to frequency in a vertical direction. This second-harmonic is subjected to Fourier transformation about its horizontal direction component by ~~an~~ a one-dimensional inverse Fourier transformation optical system comprised of a cylindrical lens (12). As a result, there is obtained, on an output plane (104), a two-dimensional space distribution (13) of the light wave-having a time distribution in the horizontal axis direction and a spectrum distribution in the vertical direction. Consequently, it is possible to convert the time signal contained in the ultra-short light pulse into the two-dimensional space distribution of time and frequency.

Please amend the paragraph on page 8, line 19 to page 9, line 2 as follows:

Of course, the present invention is not restricted to the above -described example and may be changed or modified in various ways. For example, although the diffraction grating is employed as the dispersion device in the above-described example, ~~other~~ another dispersion

device may be used. Further, although the cylindrical lenses are employed as the Fourier transformation optical system and the inverse-Fourier transformation optical system in the above-described example, ~~other~~ another optical device may be used. Furthermore, although the transmission type filter is used as the time-frequency filter in the above-described example, a phase type filter may also be used.

Please amend the paragraph on page 9, lines 5 to 12 as follows:

As described above, according to the method for ultra-fast conversion of time signal into two-dimensional space signal of the present invention, it is possible to convert the time signal into its corresponding two-dimensional space signal ~~at a~~ at an ultra-high speed without performing active-scan unlike the conventional ~~method~~ method, and also display the converted signal directly with a visible light when an infrared ray falling in a wavelength region used in optical transmission is employed.